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MINISTRY OF AGRICULTURE & FISHERIES

NATIONAL AGRICULTURAL ADVISORY SERVICE

SPELLS OF DRY WEATHER IN SOUTH-EAST ENGLAND

A REPORT PREPARED BY THE AGRICULTURAL METEOROLOGY BRANCH OF THE METEOROLOGICAL OFFICE

JANUARY 1953

1-4 CAMBRIDGE TERRACE - LONDON, N.W.1.

SPELLS OF DRY WEATHER IN SOUTH-EAST ENGLAND

1. INTRODUCTION

In 1949 a paper entitled "Spells of Dry Weather in South-West England" was published, assessing the liability of that area to dry spells, that is, days on which no more than a trace of rain was recorded. Emphasis was laid on the relative suitability of various months for haymaking.

The present paper deals in a similar manner with dry spells in south-east England. Its main objects therefore are:-

(a) To provide a method of estimating the frequency of spells of dry weather of various lengths for each of the months April to September, with special reference to spells of 3 or more days.

(b) To attempt a numerical estimation of the relative suitability for haymaking of different months in different places.

2. DATA

This investigation covers the counties of Oxford, Buckingham, Middlesex, Berkshire, Surrey, Kent, Sussex, Hampshire and the Isle of Wight. 26 stations were used, and their geographical distribution is shown in Figure 1.

Where possible the data refer to the period 1921-46, but for a few stations slightly different periods had to be used.

3. METHOD

The daily rainfall records from these stations were used to compute the frequencies of 1, 2, 3, etc., consecutive days with no measurable rainfall. Such frequencies are given in Table 1.

In computing the frequencies the following conventions were used:-

(a) A spell of dry weather starting in one month and ending in another was credited to the month with the greater proportion of the spell.

(b) If a spell was equally divided between two months, each of these months was credited with a half spell of the full length.

(c) For spells which began before April 1st., or ended after September 30th., only those days which occurred between April 1st. and September 30th., were included.

4. ESTIMATION OF FREQUENCIES

In "Statistical Methods in Climatology" Brooks and Carruthers considered the frequency of spells of wet weather at Kew, and suggested that after 2, 3, 4, ... n days of rain, there is a constant probability that it will rain the next day. A similar method has been applied in this investigation.

An examination of the data suggested that after 3, 4, 5, ... n days the probability that it would be dry the next day would be fairly constant. Therefore for each station, theoretical frequencies for each month were calculated on the assumption of a probability P constant for any one month at any one place. The observed and calculated frequencies were compared by a 'chi-squared' test; the resulting differences were seen to be no more than might be reasonably expected from chance fluctuations. As an example of this test the June workings for Worthing are set out in Appendix I to this paper.

5. METHOD OF PRESENTATION

For each month the frequencies of 1 or more, 2 or more, 3 or more dry days and of P, were plotted on maps, and isopleths drawn. Figures 2-13 give the isopleths for 3 or more days and for P for each of the months April to September. The maps for 1 or more and 2 or more dry days are not reproduced, but a sufficiently close estimate of these values can be obtained from the data in Table 1.

Figures 2-13 and Table 1 can be used to estimate the frequencies of dry spells of any length for any place in the area. For those stations where records had to be used which were different from the standard period 1921-46, weighted frequencies for 1 or more, 2 or more, 3 or more dry days are given in Table 2. For these stations values from Table 2 should be used in preference to those in Table 1.

TABLE I - Frequency of Spells of Dry Weather, 1921-46

Length of spell (days)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15⩾15	TOTAL
Oxon																
Adderbury																
April	55	29½	16	5	7	4	3	3	1	0	4	1	0	0	1	2	131½
May	41	18½	14	9½	9	7	2	3	3	3	1	2	0	0	0	3	116
June	33	20	8	10½	9	4	4	2	2	1	2	0	2	2	1	7	107½
July	48	30½	18	7	8	0	5	0	1	1	1	5	0	1	1	2	128½
August	53	22½	14	7	9	2	6	2	4	1	1	2	1	1	0	3½	129
September	52	23	19	13	4	5	3	3	1	2	1	0	2	1	0	2½	131½
Oxford																
April	48	29	14	5	9	2	3	2	3	2	2	0	1	1	0	2	123
May	51	26	18	7½	7	7	1	2	0	1	3	1	0	0	0	5	129½
June	35	18½	15	8½	8	4	5	2	1	0	3	1	2	1	1	6	111
July	61	28½	16	7½	9	2½	1	1	3	4	2	1	0	0	0	2	138½
August	53	21	16	10½	7	5½	2	4	2	2	2	2	0	1	1	3	132
September	52	25	18	8	10	5	2	4	2	0	1	0	2	0	0	2	131
Gloucestershire																
* *Lechlade*																
April	42	26	17	8	7	3	5	2½	2	2	1	1	0	2	0	3	121½
May	48	19½	18	9	8	9	4	1½	2	1	3	0	0	½	0	1	124½
June	33	20½	11	7	9	6	1	5	2	2	3	0	0	1½	1	6	108
July	57	28	14	6½	8	½	4	0	5	3½	1	1	1	1	0	1	131½
August	54	23	16	6	7	4½	4	2	2	½	1	3	2	1	0	5	131
September	48	24	19	5½	11	3	2	2	2	0	1	0	3	1	0	2	123½
Buckinghamshire																
Oving House																
April	34	31	17	7	6	2½	4	3	4	0	1	1	0	1	0	4	115½
May	55	19	9	10½	6	6½	7	2	4	2	3	1	1	0	0	1	127
June	42	19	10	6½	7	8	6	0	2	6	1	1	1	2	0	5	116½
July	57	27	14	12	8	2	3	1	6	3	1	0	2	0	0	1	137
August	58	20	11	11	7	4	2	3	3	2	1	2	1	2	0	3	130
September	64	29	17	5	8	1	3	6	0	3	0	0	3	1	0	1	141
Penn																
April	42	30	11	10	6	2	5	4	2	2	1	2	0	1	0	3	121
May	44	13	14	7½	9	4	5	2	2	3	4	1	2	½	0	4	115
June	35	22½	9	14½	7	1	3	2	2	0	0	2	2	2½	1	7	110½
July	54	29½	19	8	4	3	2	3	5	2½	2	0	1	1	0	3	137
August	57	25½	16	9	8	1	3	4	2	3½	2	1	1	0	2	2	137
September	51	28½	17	11	9	4	4	6	1	1	0	1	2	0	0	1	136½
Slough																
April	40	24	16	10½	8	3	5	3	2	0	3	2	0	1	0	2	119½
May	38	16	17	6	8	3	5	4	2	1	5	1	0	½	0	4	110½
June	39	22	10	11½	3	3	5	3	4	0	1	3	1	2½	0	5	113
July	45	27½	16	11	8	3	2	3	5	½	3	1	0	1	0	2	128
August	42	26	19	10	7	4	4	6	2	1½	0	2	0	1	1	2	127½
September	52	28½	10	11	7	1	1	3	4	1	2	0	2	0	0	3	125½
Middlesex																
Harrow																
April	38	29	12	9½	9	2	5	4	2	1	2	2	0	2	0	2	119½
May	49	14	16	9	5	8	5	3½	1	4	1	2	1	½	0	3	122
June	35	17	9	11½	7	5	2	1½	3	3	2	3	2	2½	1	4	108½
July	49	28½	18	9½	7	1	4	2½	5	2	2	0	3	0	0	1½	133
August	57	24	16	3	10	5	6	3½	5	1	2	0	2	1	2	1½	139
September	65	30½	12	10½	7	3	1	3	4	2	1	0	0	0	0	4	143

* Period 1921-27, 1929-47.

TABLE I (Continued)

Length of spell (days)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15⩾15	TOTAL
Middlesex (Contd.)																
Potters Bar																
April	45	18	17	8½	10	3	5	2	2	0	2	1	1	2	0	2	118½
May	49	17½	13	11½	10	5	5	5	2	2	0	1	2	2	0	2	127
June	44	19½	7	10	8	5	4	3	1	2½	2	3	1	2	0	5	117
July	59	20	16	8	6	2	6	1	3	1½	4	0	2	0	1	1½	131
August	49	28½	13	8	7	5	2	6	3	2	2	0	1	1	1	2½	131
September	55	36½	18	8	6	3	2	3	3	2	0	2	0	1	0	2	141½
Berkshire																
* *Reading*																
April	45	26	16	6½	10	3	6	0	2	1	3	1	0	2	0	2	123½
May	53	11	19	7	12	5	4	4	1	0	5	1	0	½	0	3	125½
June	38	18½	11	15½	6	4	3	2	2	3	2	2	1	1½	0	5	114½
July	51	34	22	12	4	4	3	0	3	2½	2	1	1	0	0	3	142½
August	54	22½	18	12	5	4	2	4	2	½	4	0	1	1	0	5	135
September	52	35	15	9	9	2	2	2	2	2	1	0	3	1	0	2	137
Upton																
April	47	29½	9	6	8	3	6	2	2	3	1	1	0	2	0	2	121½
May	52	17½	12	11	9	5½	5	2	1	2	3	1	0	½	0	3	124½
June	33	16	13	9	10	4½	2	5	2	1	1	2	2	2½	0	5	108
July	48	32	18	7½	5	5	4	2	2	4	3	1	0	0	0	2½	134
August	57	28	9	9½	7	3	0	1	3	0	4	0	1	2	1	3½	129
September	51	24	19	4	12	2	5	4	1	3	1	2	1	2	0	1	132
Surrey																
Godalming																
April	49	35	14	7½	5	2½	4	2	2	0	3	0	2	0	1	2	129
May	52	20	16	10	7	6½	6	4	1	1	3	4	0	½	1	1	133
June	36	16	8	12½	8	4	3	3	3	1	2	3	2	1½	1	4	108
July	60	24	19	12½	5	3	2	5	2	2½	1	2	1	0	0	2½	141½
August	52	25½	15	12½	9	3	3	4	0	½	4	1	2	1	0	1½	134
September	55	34½	20	8	7	1	2	1	2	2	2	0	1	1	0	3	139½
Kew																
April	42	31	12	9½	6	6	3	2	3	0	2	2	0	2	0	2	122½
May	59	17	12	8½	10	4½	6	2	2	2	4	0	0	1	0	3	131
June	42	11	12	7	8	4½	7	0	2	1	2	2	5	0	0	6	109½
July	48	33½	19	10½	5	7	3	1	2	2	2	1	2	0	0	2	138
August	43	31	15	8½	4	6	4	3	5	2	1	1	2	1	1	2	129½
September	68	27½	17	7	6	3	2	5	3	1	2	0	2	0	0	2	145½
Reigate																
April	44	29	13	9	8	0	9	1	3	0	3	1	0	1	0	2	123
May	45	20	16	8	6	6	5	5	3	2	4	1	1	0	0	3	125
June	38	18	14	8½	3	5	3	2	3	6	0	2	1	3	0	5	111½
July	59	18	16	12½	6	4	4	2	5	2	2	0	2	0	0	3	135½
August	59	23½	15	5	11	5	5	3	1	0	1	0	1	3	0	4	136½
September	51	36½	18	8	6	4	5	0	3	3	1	0	0	1	0	3	139½
Kent																
Canterbury																
April	51	18½	16	14	10	1	4	4	1	2	1	1	0	2	1	3	129½
May	53	16½	15	10	7	3½	5	3	1	4	1	2	2	1	1	2	127
June	40	25	19	8	9	3½	2	2	1	1	2	2	3	2	1	5	125½
July	49	28½	18	10	7	2	6	3	3	3	1	1	1	0	2	3	137½
August	48	26½	15	6½	7	4	8	5	1	2	2	1	1	2	1	2	132
September	59	30	12	10½	5	2	6	6	1	1	0	3	1	1	0	2	139½

* Period 1921-23, 1925-47.

TABLE I (Contd.)

Length of spell (days)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 ⩾15	TOTAL
Kent (Contd.)																
Folkestone																
April	53	26	14	7	11	3	5	3	0	0	3	0	0	2	0 3	130
May	47	25	12	9½	7	3	4	2	2	5	1	1	2	0	0 4	124½
June	31	27	16	8½	12	2	6	1	1	4	1	2	0	2	1 4	118½
July	48	26	19	7½	8	3	6	2	3	1	2	2	0	0	0 3	130½
August	55	22	13	12½	6	3	4	5	4	0	3	0	0	2	1 4	134½
September	62	28	17	11	4	5	1	1	3	4	2	0	1	1	0 2	142
† *Goudhurst*																
April	47	25	14	8	6	6½	7	5	1	2	2	1	0	1	1 1	127½
May	43	18	15	13	7	5½	8	0	2	4	3	2	2	1	0 3	126½
June	46	18	19	7	11	2	4	2	0	4	1	2	1	0	3 5	125
July	34	26½	20	9½	8	3½	6	3	4	2	1	0	4	1	1 2	125½
August	58	25	17	4½	12	3½	4	4	5	1	3	0	0	1	0 3	141
September	55	29½	18	12	7	3	3	3	2	2	1	0	2	2	0 2	141½
Sevenoaks																
April	42	30	13	5½	7	3½	6	3	1	0	2	3	0	2	0 3	121
May	53	18	19	10½	9	3½	3	3	2	2	1	2	1	2½	0 4	133½
June	38	20	12	10½	8	1	5	2	1	1	4	0	3	½	1 7	114
July	41	27½	18	13	7	6½	3	0	4	3	0	0	2	1	0 4	130
August	57	32	14	9½	10	5½	1	4	3	1	1	0	2	0	1 3½	144½
September	66	31½	15	9	5	2	7	2	2	2	2	2	2	0	0 1½	149
Hampshire																
Andover																
April	45	19½	22	6½	6	3	5	5½	1	2	2	0	1	3	0 2	123½
May	54	13½	11	19	5	5	2	5½	1	2	4	2	1	½	0 3	128½
June	30	26½	8	8½	5	4	4	1	3	1	3	1	2	2½	0 7	106½
July	48	28½	24	11	4	2	5	2	1	4	1	3	1	0	0 1½	136
August	49	31	16	8	8	4	1	3	2	3	2	2	0	3	1 2½	135½
September	52	29	15	8	8	5	1	4	1	3	0	1	2	1	0 3	133
Fordingbridge																
April	54	25½	17	5½	7	5	1	3½	0	4	0	2	1	0	0 3	128½
May	45	18½	18	11½	4	3	2	7	2	1	2	0	0	2	0 4	120
June	35	22	10	9	4	2	3	6½	2	1	3	1	3	2	1 5	109½
July	54	32	5	8	9	1	3	3	2	2½	1	3	1	1	0 3	128½
August	59	23	13	10	12	5	1	3½	0	½	1	1	2	1	1 3	136
September	60	36	9	7	8	3	2	3½	2	1	1	1	0	0	1 3	137½
* *Heckfield*																
April	48	20	12	9	9	4	3	5	0	1	2	3	1	0	0 3	120
May	43	15	11	8	11	3½	5	6	4	2	2	1	0	0	1 2	114½
June	33	13½	15	11	9	7	3	2	4	2	3	5	0	0	0 3	110½
July	45	26½	16	9½	5	3½	4	1	3	2½	2	3	2	0	0 2½	125½
August	51	21½	17	7½	10	6	1	2	1	½	2	1	2	1	2 3½	129
September	49	33½	12	6	10	3	2	6	1	4	1	1	0	1	0 1	120½
Selbourne																
April	49	25	12	6	7	2	8	1	2	2	2	1	0	1	0 2	120
May	48	21	14	10½	2	5	6	1	2	3	4	0	2	½	0 3	122
June	34	16	14	12½	5	4	0	3	3	0	2	4	2	1½	0 5	106
July	62	25	17	11	4	3	5	1	3	1½	1	1	1	0	0 2	137½
August	57	17	16	10	10	5	2	3	0	3½	1	2	2	0	0 2	130½
September	44	32	14	9	8	3	3	1	3	3	1	2	1	1	0 1	126

† Period 1922-39, 1941-48.
* Period 1921-23, 1925-47.

TABLE I (Contd.)

Length of spell (days)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 ⩾15	TOTAL
Isle of Wight																
Totland Bay																
April	46	30	19	8	5	5	4	3	2	2	2	1	1	1	0 2	131
May	41	27½	10	9½	8	6	3	4	1	3	4	2	0	1	1 2	123
June	42	18½	8	7½	8	5	3	3	3	0	2	1	5	0	2 8	116
July	49	27	20	12½	4	2	5	1	3	3½	4	2	0	1	0 2	136
August	52	27	22	12½	7	5	4	2½	3	2	1	1	2	0	1 2	144
September	57	23	12	10	8	3	2	3½	2	3½	0	2	1	1	1 2	131
Sussex																
Compton																
April	52	23½	15	10½	5	1	8	2	3	0	1	0	2	1	0 3	127
May	44	20	13	16	7	6	2	4	1	2	4	3	1	1	0 1	125
June	31	16½	12	8½	8	4	0	4	2	1	3	3	2	2	0 7	104
July	50	28	17	9	9	4	4	4	2	½	3	1	1	0	0 2½	135
August	58	24½	13	9	11	1	5	4	0	1½	1	1	0	2	2 2½	135½
September	49	28½	19	5	5	4	4	3	4	1	1	1	3	1	0 2	130½
Eastbourne																
April	68	23	17	6	3	4	6	2	2	3	1	0	1	1	0 2	139
May	41	27	14	15½	8	3	4	2	3	2	2	2	1	½	0 2	127
June	39	24	14	11½	13	3	3	0	3	4	1	1	1	1½	0 5	124
July	56	34½	10	9	7	4	6	2½	2	1	2	1	1	0	0 3	139
August	54	35½	21	12½	6	2	2	2½	1	3	1	1	1	1	1 1	145½
September	63	32	13	7½	4	4	6	3	2	2	2	0	1	0	0 2	141½
Horsham																
April	46	28½	13	6	8	3	5	4	0	2	2	0	1	2	0 2	122½
May	48	20	14	13½	7	5	6	2	1	2	3	0	0	2	1 2	126½
June	35	19	14	9½	9	3	3	1	5	0	2	3	2	2	0 6	113½
July	44	24	17	10	6	0	7	2	5	1½	2	0	1	0	0 2	121½
August	44	28	16	4	9	7	3	3	0	1½	2	2	0	2	2 3	126½
September	52	40½	15	6	7	3	4	2	3	1	1	2	1	1	1 1	140½
Worthing																
April	53	20½	16	8½	6	4½	6	3	4	2	2	1	1	1	0 2	130½
May	45	20	17	10	3	4½	8	2	1	1	6	1	1	2½	1 3	126
June	30	25½	14	10½	9	4	4	3	2	1	4	0	4	2½	0 5	118½
July	46	28	17	8	8	2	6	3	3	3½	3	0	2	0	0 2½	132
August	54	27	15	9	8	3	3	4½	1	3½	2	1	0	1	0 6	138
September	57	27	17	10	4	3	2	1½	3	3	0	1	2	1	2 2½	136

TABLE II - Frequency of Spells of 1 or more, 2 or more and 3 or more days with dry weather (weighted to period 1921-46)

These weighted values have been computed for stations with data for a period other than 1921-46.

	April			May			June			July			Aug.			Sept.		
	⩾1	⩾2	⩾3	⩾1	⩾2	⩾3	⩾1	⩾2	⩾3	⩾1	⩾2	⩾3	⩾1	⩾2	⩾3	⩾1	⩾2	⩾3
Goudhurst	130½	80½	55½	126½	84½	67	124	80	64	122½	91½	65½	140	85	63	142½	86½	58
Heckfield	121	73	53	116½	72½	54½	111½	78½	64	124½	80½	52	130	78	55½	131½	80½	47
Lechlade	124½	85	54½	123	78½	57	108	74	55½	127	71½	45½	136	80	57	123½	78½	53½
Reading	121½	78½	52½	123½	71½	60½	113½	77½	58	135	89½	55½	136	81	58½	138	85	48

TABLE III - Average Length of Spells of Dry Weather (days)

	(a) 1 day or more APRIL			(b) 3 days or more MAY			(c) 7 days or more JUNE		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Oxon									
Adderbury	3.1	6.4	11.5	3.7	6.3	11.1	4.8	8.0	13.2
Oxford	3.2	6.4	10.9	3.4	6.4	13.5	4.5	7.4	13.0
Glos.									
Lechlade	3.6	6.5	11.4	3.2	5.5	9.8	4.7	8.0	12.0
Bucks.									
Oving House	3.7	6.6	11.6	3.4	6.4	9.6	4.3	7.7	11.9
Penn	3.7	7.0	11.3	4.2	7.1	11.4	4.6	8.1	14.1
Slough	3.7	6.3	11.1	4.1	6.7	11.0	4.4	8.0	12.5
Middlesex									
Harrow	3.7	6.7	10.9	3.8	6.5	10.9	4.7	7.8	12.6
Potters Bar	3.6	6.3	11.4	3.7	6.3	10.4	4.3	7.8	12.0
Berks.									
Reading	3.5	6.4	11.3	3.6	6.1	11.0	4.4	7.3	12.9
Upton	3.5	7.1	11.0	3.5	6.3	10.9	4.6	7.4	12.6
Surrey									
Godalming	3.2	6.5	11.4	3.6	6.2	10.2	4.5	7.4	11.8
Kew	3.5	6.6	11.8	3.5	6.6	10.7	4.6	7.7	12.2
Reigate	3.5	6.6	10.7	3.9	6.6	10.5	4.5	7.8	12.5
Kent									
Canterbury	3.5	6.1	11.0	3.7	6.8	11.3	4.1	7.1	13.1
Folkestone	3.3	6.4	11.5	3.8	7.3	12.1	4.2	6.9	12.0
Goudhurst	3.5	6.4	10.0	4.1	6.6	10.8	4.1	7.1	12.6
Sevenoaks	3.7	7.0	11.3	3.7	6.5	11.9	4.6	7.9	13.0
Hants.									
Andover	3.8	6.5	11.4	3.7	6.6	11.2	5.1	9.1	14.2
Fordingbridge	3.4	6.7	13.1	3.8	6.6	11.7	4.7	8.3	12.3
Heckfield	3.7	6.8	11.8	3.9	6.6	10.0	4.5	6.7	11.6
Selborne	3.4	6.6	10.4	3.7	6.9	11.3	4.4	7.1	12.6
Isle of Wight									
Totland Bay	3.5	6.5	11.8	3.8	6.8	10.9	4.8	8.6	13.1
Sussex									
Compton	3.4	6.5	10.7	3.7	6.2	10.7	5.0	8.1	13.5
Eastbourne	3.0	6.4	10.7	3.6	6.1	10.8	4.1	6.9	12.7
Horsham	3.5	6.8	11.3	3.6	6.2	10.6	4.7	7.7	13.3
Worthing	3.6	6.5	10.5	4.1	7.0	11.1	4.7	7.5	12.5

TABLE III (Contd.)

	(a) 1 day or more JULY			(b) 3 days or more AUGUST			(c) 7 days or more SEPTEMBER		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Oxon									
Adderbury	3.3	6.3	11.3	3.7	7.0	11.5	3.3	6.0	11.7
Oxford	2.9	5.9	10.8	3.7	6.8	12.3	3.2	5.9	11.5
Glos.									
Lechlade	3.0	6.2	10.1	3.9	7.6	13.4	3.3	5.9	11.8
Bucks.									
Oving House	3.1	5.8	9.8	3.5	6.9	11.8	3.0	6.4	11.1
Penn	3.3	6.3	10.7	3.3	6.4	10.6	3.2	5.9	10.6
Slough	3.4	6.0	10.5	3.6	6.2	10.9	3.4	7.2	12.9
Middlesex									
Harrow	3.3	6.0	10.1	3.5	6.6	10.2	3.1	6.7	12.5
Potters Bar	3.3	6.3	10.3	3.7	7.1	11.9	3.2	6.4	12.4
Berks.									
Reading	3.2	5.8	11.3	3.7	6.8	12.8	3.2	6.4	12.1
Upton	3.3	6.1	10.4	3.4	7.5	13.7	3.3	6.0	9.9
Surrey									
Godalming	3.2	5.9	10.6	3.3	6.0	10.7	3.1	6.3	13.0
Kew	3.2	5.8	10.9	3.6	6.6	10.5	3.0	6.2	10.7
Reigate	3.4	6.3	10.8	3.4	6.6	11.4	3.2	6.3	11.8
Kent									
Canterbury	3.6	6.5	10.7	3.7	6.7	10.2	3.2	6.5	10.0
Folkestone	3.4	6.1	10.4	3.7	6.8	11.1	3.1	6.2	11.7
Goudhurst	4.0	6.3	10.4	3.5	6.6	11.0	3.3	6.3	11.9
Sevenoaks	3.7	6.2	12.0	3.3	6.4	11.5	3.0	6.3	10.0
Hants.									
Andover	3.2	5.6	10.2	3.6	6.7	11.6	3.4	6.6	12.2
Fordingbridge	3.3	7.3	10.9	3.4	6.7	13.7	3.0	6.8	11.6
Heckfield	3.6	6.5	10.9	3.7	6.9	13.9	3.5	6.5	10.9
Selborne	2.9	5.7	10.1	3.3	6.0	11.0	3.3	6.1	10.6
Isle of Wight									
Totland Bay	3.4	6.1	10.3	3.5	6.2	12.1	3.3	6.6	11.2
Sussex									
Compton	3.3	6.0	10.4	3.4	6.5	11.1	3.4	6.4	10.5
Eastbourne	3.2	6.7	10.8	3.0	5.5	10.6	3.0	6.3	10.1
Horsham	3.5	6.1	10.1	3.7	6.8	11.8	3.2	6.6	11.3
Worthing	3.6	6.4	10.4	3.7	7.1	12.0	3.4	6.7	12.1

6. AVERAGE LENGTH OF SPELLS OF DRY WEATHER

Table III gives the following information:-

(a) average length of dry spells
(b) average length of dry spells lasting at least 3 days
(c) average length of dry spells lasting at least 7 days.

The chief features of the monthly distribution of the average length of spells LASTING AT LEAST 3 DAYS are as follows:-

APRIL. The average length is greater than 7 days only at Upton (7.1) which is situated near the Oxford-Berkshire border south of Oxford; the average nowhere falls below 6 days.

MAY. The only spell lasting less than 6 days occurs in the north-west of the region, at Lechlade (5.5).

The spells last from 6 to 6½ days:-

(a) in Berkshire, Oxfordshire, and north Buckinghamshire,
(b) in Sussex (excluding the west coast which has 7 days) and west Surrey, and
(c) at Potters Bar in north Middlesex.

The spells last longer than 6½ days:-

(a) in Middlesex and Kent and
(b) in Hampshire and the Isle of Wight.

JUNE. The average length is as great as 9 days at Andover, and is over 8 days:-

(a) throughout the Hampshire Basin and the Isle of Wight,
(b) in the Upper Thames Valley.

The average falls below 7 days only along the S.E. coast from Eastbourne to Folkestone (6.9 days).

JULY. The spells are less than 6 days long:-

(a) over central Buckinghamshire and south Oxfordshire
(b) over all except east Surrey.

The most common spell is of average length 6 to 6½ days being found in all other parts of the region except in Hampshire where spells of 7.3, 5.7, 5.6 days are respectively found at Fordingbridge, Selborne, and Andover.

AUGUST. In this month the average increases to between 7 and 7.6 days:-

(a) in west Berkshire aand in Oxfordshire
(b) along the coast of west Sussex, and
(c) in the northern parts of Middlesex.

The only station to have an average of less than 6 days is Eastbourne (5.5 days).

SEPTEMBER. The highest average is reached at Slough (Bucks.) of 7.2 days; averages of between 6½ and 7 days are found:-

(a) in Hampshire (except on the higher land near Selborne), along the west Sussex coast and in the Isle of Wight,
(b) in the Weald of Sussex, and
(c) in Middlesex.

Nowhere does the average fall appreciably below 6 days.

The features of the average length of spells LASTING AT LEAST 7 DAYS are as follows:-

APRIL. The most common spell is of average length greater than 11 days (>13 days at Fordingbridge).

Values less than 11 days are found:-

(a) from S.E. Surrey along the N.E. border of Sussex and the Sussex coast to the higher land near Selborne in east Hampshire,
(b) in Middlesex, and
(c) at Oxford.

MAY. In this month the average length of spell falls to values less than 11 days over an a[illegible] which includes:-

(a) west Berkshire, north-east Hampshire (Heckfield 10 days), and all Surrey,
(b) the Isle of Wight.

It becomes less than 10 days at:-

(a) Lechlade (9.8 days), and
(b) Oving House (9.6 days).

At Oxford a value of 13.5 days is found.

JUNE. The value of 12 days is exceeded over most of the area, and the averages of 14.2 at Andover, and 14.1 days at Penn are the highest for any month; only in the Aldershot region are values found as low as 11½ days.

JULY. The highest average is that of 12 days for Sevenoaks, elsewhere 11 days is only exceeded:-

(a) in north Oxfordshire, and
(b) at Reading.

The lowest average for the month is at Oving House in Bucks. (9.8 days).

AUGUST. Averages of between 12 and 14 days are found:-

(a) in Berkshire and the south of Oxfordshire,
(b) in the Isle of Wight and in the New Forest and Aldershot regions of Hampshire.

Averages of 11 days or less are found:-

(a) near the Middlesex-Bucks. border,
(b) in the Eastbourne region,
(c) in the Godalming area of Surrey, and
(d) in the Kentish Weald and N.E. Kent.

The lowest averages of 10.2 days are recorded at Canterbury and Harrow.

SEPTEMBER. The spells have an average length of more than 11 days over most of the region, the longest spell (13 days) occurring in S.W. Surrey. The areas having spells of average length less than 11 days are found:-

(a) near the east Hampshire border,
(b) in the Eastbourne region,
(c) in N. Kent, and
(d) at Penn in Buckinghamshire.

The lowest recorded value is of 9.9 days at Upton (Berks.)

For most regions the greatest average length of spells lasting at least 7 days occurs in June withthe following exceptions:-

(a) Near the west borders of Middlesex and Surrey, where September averages are higher.
(b) Reading district, N.E. Hampshire, and the New Forest, where August averages are higher.
(c) Oxford and Folkestone where May has the highest average. In the New Forest and N.E. Hampshire, June has the third highest average, April having a higher average.

TABLE IV - Number of Years in 26 with at least One Spell of Dry Weather of Lengths ⩾3, ⩾6, ⩾9, ⩾12, ⩾15 days

	Length of spell (days)				
	⩾3	⩾6	⩾9	⩾12	⩾15
Oxon					
Adderbury					
April	25	16	10	5	4
May	26	21	12	5	3
June	25	22	17	12	8
July	26	16	11	8	3
August	25	16	12	6	4
September	26	17	9	6	3
Oxford					
April	26	16	11	4	2
May	24	16	10	7	5
June	26	22	15	11	7
July	25	17	12	3	2
August	25	16½	11	5	3
September	26	15	7	4	2
Glos.					
Lechlade					
April	25	16	11	6	3
May	26	18	9	1½	1
June	26	21	16	8½	7
July	25	17	13½	5	1
August	25	18½	12½	9	5
September	26	15	10	6	2
Bucks.					
Oving House					
April	24	16½	10	6	4
May	25	20	12	3	1
June	25	22	16	8	5
July	26	17	12	3	1
August	25	17	11	6	3
September	25	15	8	5	1
Penn					
April	25	19	10	6	3
May	26	21	15	7½	4
June	26	20	17	13½	8
July	25	18	12½	5	3
August	25	17	10½	4	3
September	26	16	6	4	1
Slough					
April	25	16	9	5	2
May	26	20	13	5½	4
June	26	21	16	10½	5
July	26	17	11½	5	2½
August	26	18	9½	5	2½
September	24	15	11	5	3
Middlesex					
Harrow					
April	24	18	10	6	2
May	26	21	12	6	3
June	26	22	20	11½	5
July	26	18	13	5	2
August	26	20	11	5	3
September	26	14	9	4	4
Middlesex					
Potters Bar					
April	26	16	9	6	2
May	26	19	10	7	2
June	26	22	16	10	5
July	25	17	11½	4	2
August	25	19	12	5	3
September	25	15	10	5	2
Berkshire					
Reading					
April	26	17	10	5	2
May	26	19	11	4½	3
June	26	21	17	9½	5
July	26	16	12½	6	3½
August	26	18	12½	6	4
September	26	17	11	6	2
Upton					
April	25	17	11	5	2
May	26	17	11	4½	3
June	26	22½	16	11½	5
July	25	19	12	4	3
August	25	18	12	7	4
September	26	17	10	6	1
Surrey					
Godalming					
April	24	16½	10	5	3
May	26	22	12	6	2
June	26	21	17	11½	5
July	26	17	10½	6	3
August	26	15	10½	5	2
September	26	12	9	5	3
Kew					
April	25	17	10	6	2
May	26	21	13	4	3
June	26	22½	18	13	6
July	26	17	11	6	2½
August	26	20	14	6	3
September	25	16	8	3	2
Reigate					
April	25	17	9	4	2
May	26	22	14	5	3
June	26	23	18	11	5
July	26	22	14	6	3½
August	25	17	8	7	4
September	25	17	9	4	3
Kent					
Canterbury					
April	26	17	11	7	4
May	26	19½	14	9	4
June	26	21	15	12	6
July	26	20	12	7	5
August	26	21	11	6	2
September	26	20	7	5	2

TABLE IV (Contd.)

	Length of spell (days)				
	⩾3	⩾6	⩾9	⩾12	⩾15
Kent					
Folkestone					
April	25	16	8	5	3
May	26	22	16	7	4
June	26	21	14	8	5
July	26	16	10	4	3
August	25	20	12	5	3
September	26	16	10	3	2
Goudhurst					
April	25	20½	9	4	2
May	26	23	17	7	3
June	25	19	16	11	8
July	26	21	14	6	3
August	26	20	13	4	3
September	25	16	10	5	2
Sevenoaks					
April	25	18	10	8	3
May	26	20	14	9½	4
June	26	20	18	11½	8
July	26	20	14	6	3
August	25	15½	10	6	4½
September	24	19	9	4	1½
Hants.					
Andover					
April	26	19	11	6	2
May	26	20	13	6½	3
June	26	24	18½	12½	7
July	26	17	13	8	2
August	25	18	14	8	4
September	24	16	10	7	3
Fordingbridge					
April	25	16	9	5	3
May	25	20	12	6	4
June	26	22	16	11	6
July	25	18	12½	8	3
August	25	16	8½	7	4
September	22	13	9	5	4
Heckfield					
April	25	18	10	7	3
May	26	20	12	4	3
June	26	22	15	7	3
July	26	17	13½	8	3
August	26	17	12½	8	6
September	26	17	10	3	1
Selborne					
April	24	17	9	4	2
May	26	20	15	5½	3
June	26	21	16	11½	5
July	26	16	9½	4	2
August	26	17	8½	4	2
September	25	14	9	4	1
Isle of Wight					
Totland Bay					
April	26	18	10	5	2
May	24	20	15	6	3
June	26	22	18	15	10
July	25	18	14½	5	2
August	26	18	11	6	3
September	23	16	10½	6	3
Sussex					
Compton					
April	25	17	9	6	3
May	25	21	14	6	1
June	26	24	18	13	7
July	26	19	9½	5	3
August	26	14	8½	7	5
September	26	18	10	6	2
Eastbourne					
April	24	18	10	4	2
May	25	17	14	5½	2
June	25	20	17	8½	5
July	23	18	10	5	3
August	26	13	9	5	2
September	25	19	7	3	2
Horsham					
April	24	17	9	5	2
May	26	20	12	5	3
June	26	22	18	13	6
July	26	18	11½	4	2
August	26	19	9½	7	4
September	25	16	9	5	2
Worthing					
April	26	18½	12	5	2
May	26	24	16	7½	4
June	26	22	18	10½	5
July	26	20	12½	5	3
August	26	18	12½	7	5½
September	26	18	12	7	4½

7. CHANCES OF A SPELL OF 3 OR MORE, 6 OR MORE, 9 OR MORE, 12 OR MORE, AND 15 OR MORE DRY DAYS IN ANY ONE YEAR.

Table I giving the frequency of spells within the 26 year period, still gives no precise indication of their distribution. Table IV has therefore been constructed to show the number of years when there was at least one spell of the above lengths. In the compilation the same conventions were used as in Table I except that:-

(a) If a spell is equally divided between two months each month is credited with half a spell of that length, and a whole spell of ½ length, e.g. if a spell comprised of 9 days in May and 9 days in June is observed, then each month is credited with one half spell of 18 days or more, and also with a whole spell of 12 days or more.

(b) When a dry spell starts in one month and ends in another, the month with the shorter number of dry days is credited with a spell of length equal to those days. Even though the full spell is credited to the month with the greater number of days, it is obviously untrue to say that the other month did not have a spell of the shorter length.

This table can be used to estimate the chances of a given spell in any one year.

For example, at Harrow there were 13 years out of 26 when there was at least one dry spell of 9 days or more in July; we may thus say that there is an even chance of such a spell in any one particular year.

Reviewing the table as a whole we see that the chances of at least one spell of three days or more with no rain during the April to September months are high at all stations - at least 12 to 1 on. Reading, Canterbury, and Worthing have experienced such a spell in each of the months every year of the reviewed period.

For at least one spell of 6 or more days, with the exception of an even chance at Fordingbridge in September, the chances are nowhere and at no time less than 14 to 12 on, and are as high as 12 to 1 on at Worthing in May and at Andover and Compton in June.

For at least one spell of 9 or more days, the chances in September fall, on the average, as low as 2 to 1 against, or even as low as 10 to 3 against at Penn, but in June at most stations are still of the order of 2 to 1 on.

At stations such as Penn, Kew, Canterbury, Andover, Totland Bay, Compton, and Horsham, there is an even chance of at least one dry spell of 12 days or more in June; elsewhere the odds may fall as low as 5 to 2 against.

The chances of at least one spell of 15 or more days vary considerably, being as high as two years out of five at Totland Bay in June, and as low as one year out of 26 in several places in the wetter months.

8. HAYMAKING

A comparison of the suitability of various months in south-east England.

To compare the suitability of the months May to August for haymaking the method devised in the previous paper was used. An index was devised which combines the effect of both the frequency and length of the dry spells. Indices were compared by two methods of assessment:-

(a) A value of 3 is given to a spell of 3 days, 4 to 4 days, etc., the sum of such values being the index for the month.

(b) A value of 1 is given to a spell of 3 days, and a value of 2 to a spell of 4, on the assumption that two spells of 3 days can be used for haymaking in a dry spell of 4 days. Similarly a spell of 5 days is given a value of 3, etc. The total is again used as the monthly index.

It was found that no great difference existed in the magnitudes of the two sets of indices, and in the following discussion, those obtained by the method (a) will be used.

The monthly indices for both methods are given in Table V.

TABLE V - Monthly Indices of Suitability for Haymaking (Computed by two methods)

	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
	(a)	*(b)*	*(a)*	*(b)*	*(a)*	*(b)*	*(a)*	*(b)*	*(a)*	*(b)*	*(a)*	*(b)*
Oxon												
Adderbury	299	205	355	242	438	329	314	214	375	268	340	227
Oxford	293	201	336	231	428	313	289	191	392	276	316	208
Glos.												
Lechlade	347	240	312	198	437	328	287	194	408	300	306	203
Bucks.												
Oving House	333	232	340	234	425	314	309	203	361	257	306	210
Penn	342	244	410	294	430	324	336	229	347	238	334	220
Slough	338	237	380	267	416	312	334	223	368	249	322	232
Middlesex												
Harrow	350	245	386	268	440	327	335	224	385	269	319	224
Potters Bar	347	236	383	262	415	308	327	223	380	273	320	220
Berks.												
Reading	334	229	378	255	426	310	333	218	400	283	320	220
Upton	318	228	348	238	436	318	332	224	330	242	344	229
Surrey												
Godalming	294	204	381	259	416	304	340	225	339	226	315	215
Kew	328	229	361	251	437	324	329	216	365	254	309	209
Reigate	329	229	397	277	433	322	368	251	356	248	329	225
Kent												
Canterbury	369	249	390	275	430	309	387	267	384	269	326	225
Folkestone	327	225	382	277	418	297	342	229	392	277	320	216
Goudhurst	354	243	435	304	430	308	409	279	381	265	357	243
Sevenoaks	343	245	406	283	442	330	384	261	353	242	323	220
Hants.												
Andover	385	267	400	278	455	355	336	217	371	260	342	238
Fordingbridge	328	230	371	258	436	331	311	226	361	253	281	198
Heckfield	354	250	371	258	432	304	351	243	389	276	303	217
Selborne	304	212	366	260	400	288	289	188	338	225	306	206
Isle of Wight												
Totland Bay	357	247	372	263	479	368	363	243	404	274	335	233
Sussex												
Compton	333	230	378	256	457	344	343	229	347	241	337	231
Eastbourne	306	210	361	243	419	297	324	227	309	197	294	201
Horsham	325	229	363	246	461	342	329	222	370	261	315	219
Worthing	370	257	427	305	471	345	374	258	402	288	346	242

From this table we may deduce:-

(i) Judging by the criterion of dry spells, June is the best month at every station in the area with the exception of Goudhurst where May is the best.

(ii) Over the area as a whole, May and August are almost equally good, May being slightly better.

(iii) July is at most the third best month; it is better than August along the North Downs and nowhere better than May.

9. COMPARISON WITH OTHER PARTS OF ENGLAND

From the previous paper on dry spells the following indices are quoted:-

	May	June	July	August
Cambridge	388	441	359	376
Hoylake	340	366	256	267
Newquay	300	345	204	252
Weymouth	344	493	348	374

These four stations were selected because of those examined in south-west England, Newquay had the worst record, and Weymouth the best, and Cambridge and Hoylake were used as standards of comparison.

Comparable figures for the best station in the south-east, Worthing, and the worst, Selborne, together with Goudhurst are as follows:-

	May	June	July	August
Selborne	366	400	289	338
Goudhurst	435	430	409	381
Worthing	427	471	374	402

Comparing the two sets of figures we see that the best regions of the south-east are the most suitable in respect of dry spells except for the Weymouth region in June. The worst regions in the south-east are less suitable than Cambridge but more suitable than the Wirral, and are about the average for the south-west region. The Goudhurst figures have been included to show the somewhat unusually high suitability index for April and July which is typical of the Weald and the North Downs.

10. LONG DRY SPELLS

In the previous paper, attention was concentrated on the chances of obtaining a sufficiently long dry period to perform the necessary operations for haymaking without the expensive modern aids of grass drying. As experience and statistics show us, such chances are higher in the south-east, and the problem is not so urgent. In fact, the problem of drought is probably the more important. Therefore the following dry weather index was calculated to compare the variations from time to time and place to place of long dry spells:-

A value of 7 was given to a spell of 7 days, 8 to 8 days etc., and the monthly totals were entered in Table VI.

TABLE VI - DRY WEATHER INDEX

	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Oxon						
Adderbury	172	188	303	192	248	181
Oxford	174	175	285	151	234	150
Glos.						
Lechlade	211	128	295	176	274	154
Bucks.						
Oving House	209	202	286	167	225	189
Penn	227	269	304	209	217	170
Slough	200	247	307	184	212	207
Middlesex						
Harrow	219	229	302	202	245	188
Potters Bar	194	218	284	205	244	186
Berks.						
Reading	192	203	277	175	249	182
Upton	209	190	284	193	212	198
Surrey						
Godalming	182	219	278	190	181	182
Kew	188	214	306	163	230	182
Reigate	214	251	312	216	206	189
Kent						
Canterbury	209	249	275	246	254	211
Folkestone	184	255	264	197	255	175
Goudhurst	211	270	278	250	231	202
Sevenoaks	226	243	318	204	190	205
Hants.						
Andover	245	236	348	188	227	195
Fordingbridge	190	233	338	213	192	168
Heckfield	213	230	256	219	222	185
Selborne	197	242	259	156	170	170
Isle of Wight						
Totland Bay	213	228	355	221	223	201
Sussex						
Compton	215	204	323	187	211	211
Eastbourne	192	199	248	199	154	181
Horsham	204	202	318	208	219	193
Worthing	232	294	318	239	263	217

Considering the totals, for the six months April to September, added for each station, we note that the regions most likely to suffer from long dry spells are:-

(a) The Isle of Wight and the south coast west of Beachy Head.
(b) The part of Hampshire on the eastern edge of Salisbury Plain.
(c) The Goudhurst and Canterbury areas.

The areas which are likely to suffer least are:-

(a) The Oxford area.
(b) The Selbourne region of Hampshire.
(c) The coast around Eastbourne.

The main features of the monthly distributions are as follows:-

APRIL. In this month there is little difference from place to place over the area, the highest index being 245 at Andover, and the lowest 172 at Adderbury. The areas most affected are around Andover and Worthing, those least affected are the Kent and east Sussex coast, Oxfordshire, the New Forest, the Thames Valley, and the Downs from Selbourne to Guildford.

MAY. The highest indices occur in the Worthing region (294), along the North Downs east of Guildford, in the Weald of Kent, and in the south of Buckinghamshire. Oxfordshire and the west of Berkshire have indices below 200, Lechlade having the lowest with 128.

JUNE. Indices are high over the whole region, the value of 300 being exceeded in the areas from south Buckinghamshire and east Berkshire along the North Downs into west Kent, from the Hampshire Basin and Isle of Wight (Totland Bay 355) along the Sussex coast, and in the Weald of Sussex. Nowhere do values fall much below 250, 248 at Eastbourne being the lowest for the month.

JULY. The value of 250 is reached only in the Weald of Kent and for much of the region values are below 200, with a minimum of 151 at Oxford. Values of 200 are exceeded in Middlesex, along the North Downs eastwards from Guildford, in the Sussex Weald, in the Aldershot area, and along a region in the south including the New Forest, the Isle of Wight and west Sussex coast.

AUGUST. Indices of 250 or more are found in east Kent and the coast of west Sussex, with a maximum of 274 at Lechlade in west Oxfordshire. Values are below 200 in the New Forest and Hampshire Basin, along the Downs from Selbourne to Sevenoaks, and reach a minimum of 154 at Eastbourne.

SEPTEMBER. Little place-to-place variation exists, although the Upper Thames Valley has lower values than elsewhere, with a minimum at Oxford (150). Worthing (217) has the highest value.

Agricultural Meteorology Branch,
Meteorological Office.

January, 1953

APPENDIX I

As an example, the method of extracting the value of P for Worthing in the month of June is given below:-

Frequency of dry spells at Worthing in June

(1)	(2)	(3)	(4)	(5)	(6)
Length of dry spell (days)	Observed Frequency (O)	Observed Cumulative Frequency	Computed Cumulative Frequency	Computed Frequency (C)	$\frac{(O-C)^2}{C}$
1	30	118½			
2	25½	88½			
3	14	63	63	11.5	0.54
4	10½	49	51.5	9.4	0.13
5	9	38½	42.1	7.7	0.22
6	4	29½	34.4	6.3	0.84
7	4	25½	28.1	5.1)	
8	3	21½	23.0	4.2)	0.57
9	2	18½	18.8	3.4)	
10	1	16½	15.4	2.9)	1.73
11	4	15½	12.5	2.2)	
12	0	11½	10.3	1.9)	
13	4	11½	8.4	1.5)	1.88
14	2½	7½	6.9	1.3)	
15	0	5	5.6	5.6)	
16 or more	5	32 *		)	0.06

32* is the value of the cumulative frequencies for 16, 17, 18, ... 28 days. It is needed to obtain the total of 345, used in the calculation of P.

Given N spells of 3 or more days, the assumption of a constant probability P implies that the theoretical frequency of spells of 3 or more, 4 or more, 5 or more, days, etc., is given by the successive terms of the series:-

$$N (1 + P + P^2 + P^3 + \ldots\ldots)$$

The sum of this series is T, the sum of the cumulative frequencies from 3 or more days onwards.

Therefore, $T = N/(1-P)$

hence, $P = 1 - N/T$.

Using the observed figures T is 345, and N is 63, hence P is 0.817.

In the above table, columns 2 and 3 are the observed values. Column 4 is constructed by use of the observed value of 63 and the calculated P; successive subtraction of the figures in column 4 gives the computed frequencies in column 5, which are to be compared with the observed frequencies in column 2.

This comparison is done by a "chi-squared" test; the value for this parameter is the sum of the figures in column 6, that is 6.0.

With six degrees of freedom, the probability of obtaining a greater value for this and hence greater deviations, purely due to chance, from the actual frequencies lies between 0.30 and 0.50; there is thus no reason to reject the hypothesis of a constant probability.

APPENDIX II

Test of Method

This method has been used to estimate the frequencies for Wisley. The estimated frequencies were then compared with the observed frequencies extracted from the daily records; the results of a chi-squared test showed that the differences were statistically acceptable.

As an example the working for April is given below:-

	Frequencies		
	1 or more	2 or more	3 or more, days
Reigate	123	79	50
Godalming	129	80	45
Heckfield	120	72	52
Wisley estimate from map	125	80	47

From Figure 3 the probability P for Wisley is estimated to be 0.78. Then

Estimated frequency of 4 or more days .... $47 \times (0.78)$
Estimated frequency of 5 or more days .... $47 \times (0.78)^2$, etc.

For length of spell greater or equal to the frequencies for Wisley are:-	1	2	3	4	5	6	7	8	9	10	days
Estimated	125	80	47	36.6	28.6	22.3	17.4	13.6	10.6	8.3	
Actual	126	69	47½	35½	27	19	16	11	11	9	

By subtraction of successive terms:-

	Frequencies										
Spell length	1	2	3	4	5	6	7	8	9	≥10	days
Estimated	45	33	10.4	8	6.3	4.9	3.8	3.0	2.3	8.3	
Actual	57	21½	12	8½	8	3	5	0	2	9	

From these values chi-squared is 3.20. For five degrees of freedom the probability of obtaining a greater value for chi-squared and hence greater deviations, purely due to chance, from the actual frequencies is 0.70. Thus the estimation is statistically acceptable.

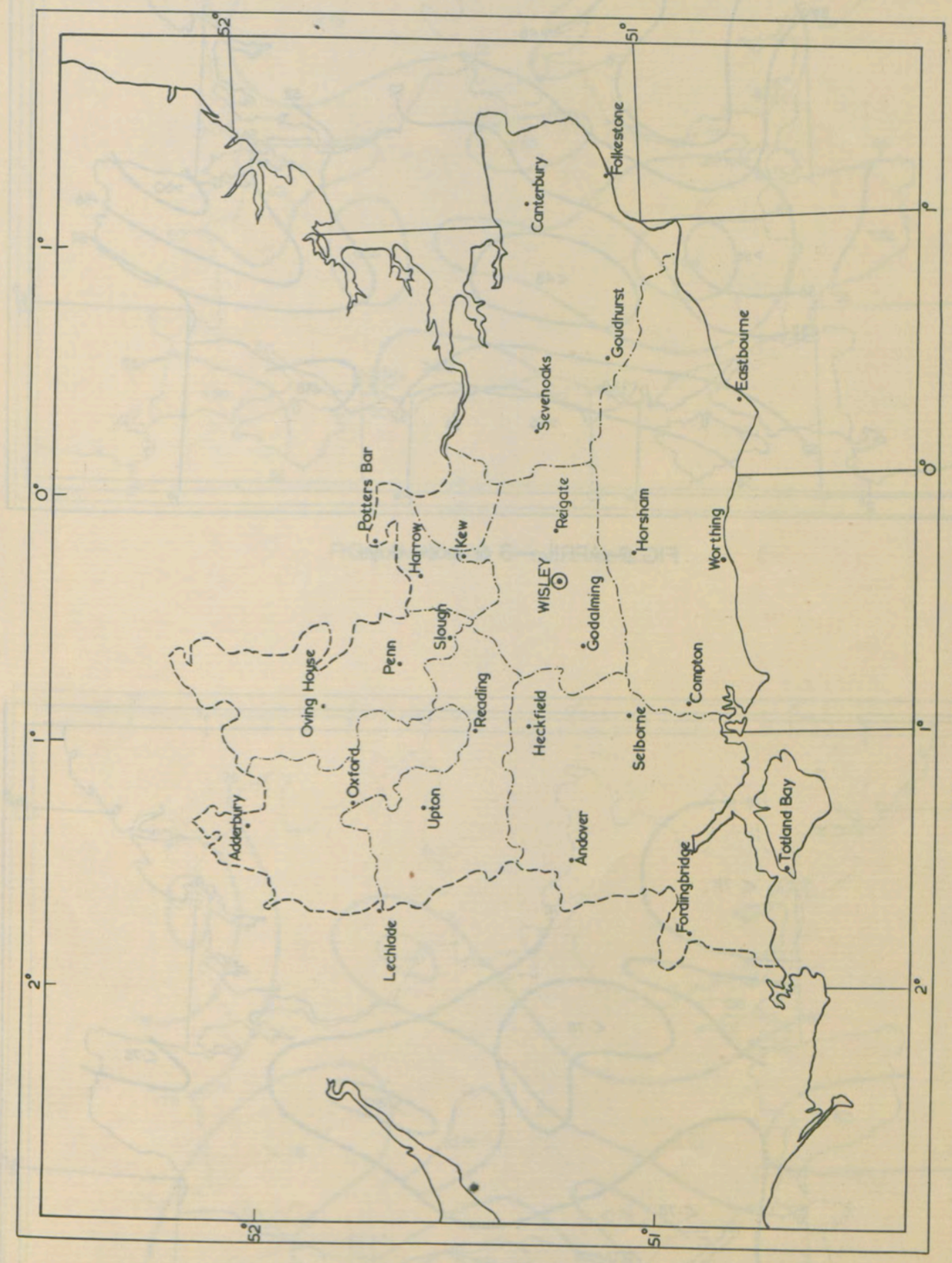

FIG.1. — INDEX MAP OF STATIONS
The station marked ⊙ was used to test the method

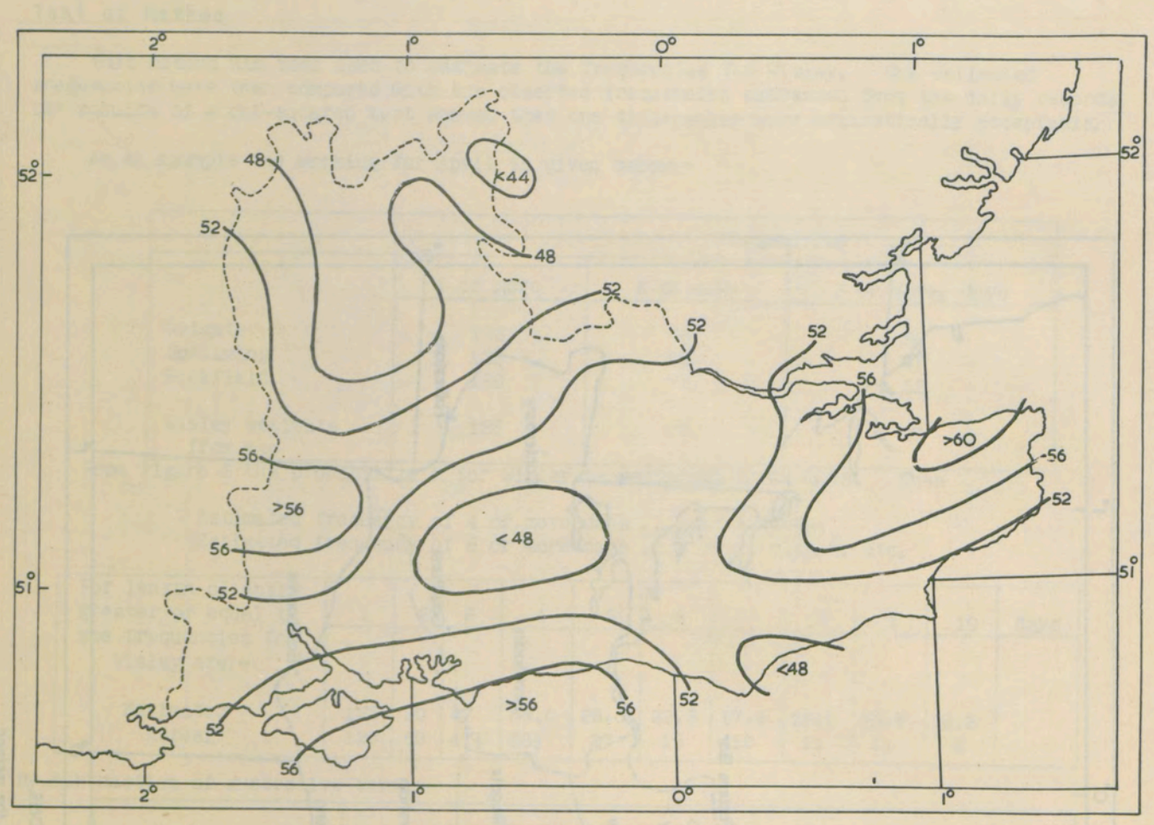

FIG. 2– APRIL — 3 or more days

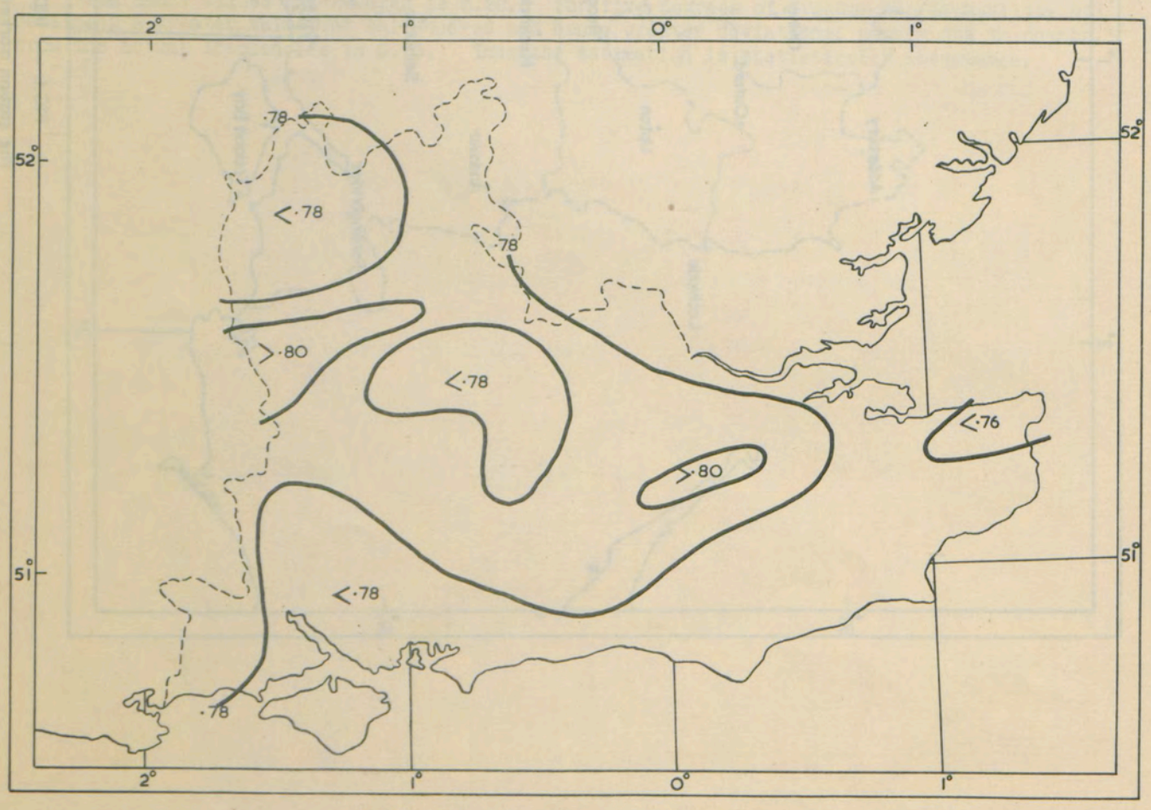

FIG.3 – APRIL, ISOPLETHS OF P

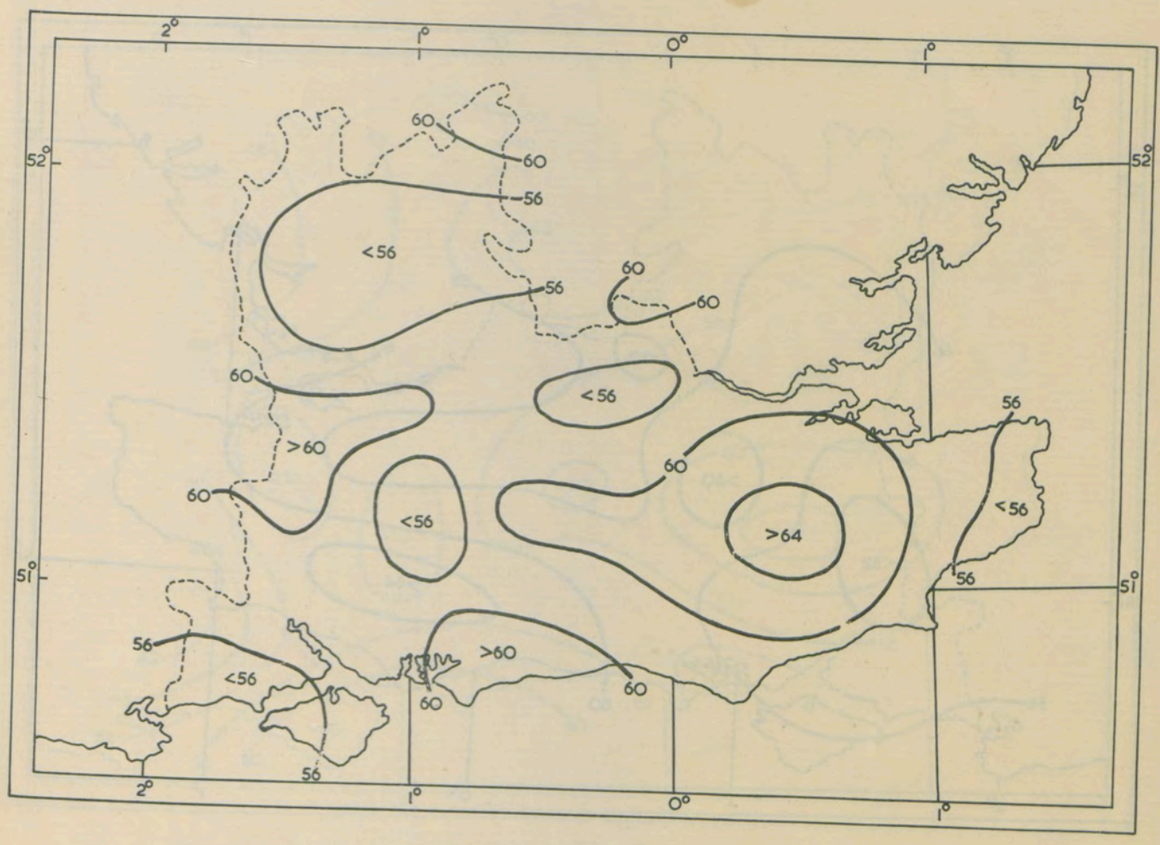

FIG.4. MAY — 3 or more days

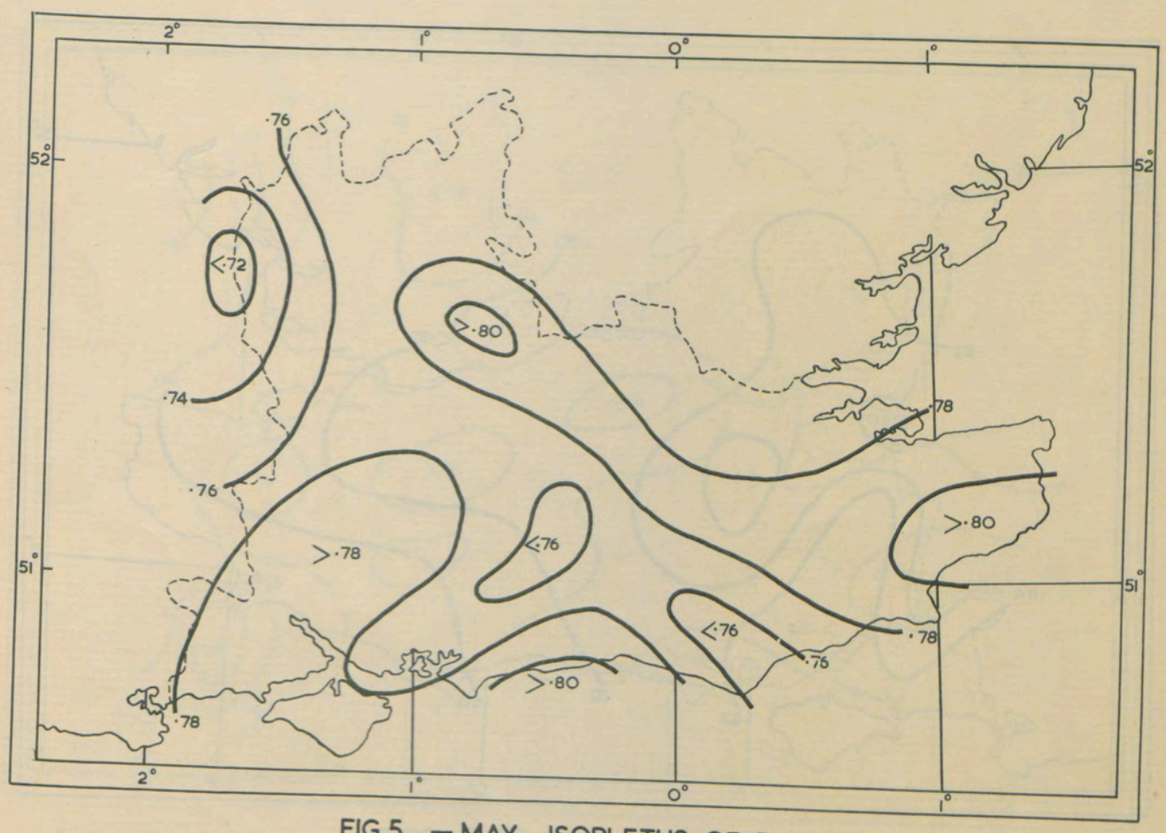

FIG.5 — MAY, ISOPLETHS OF P

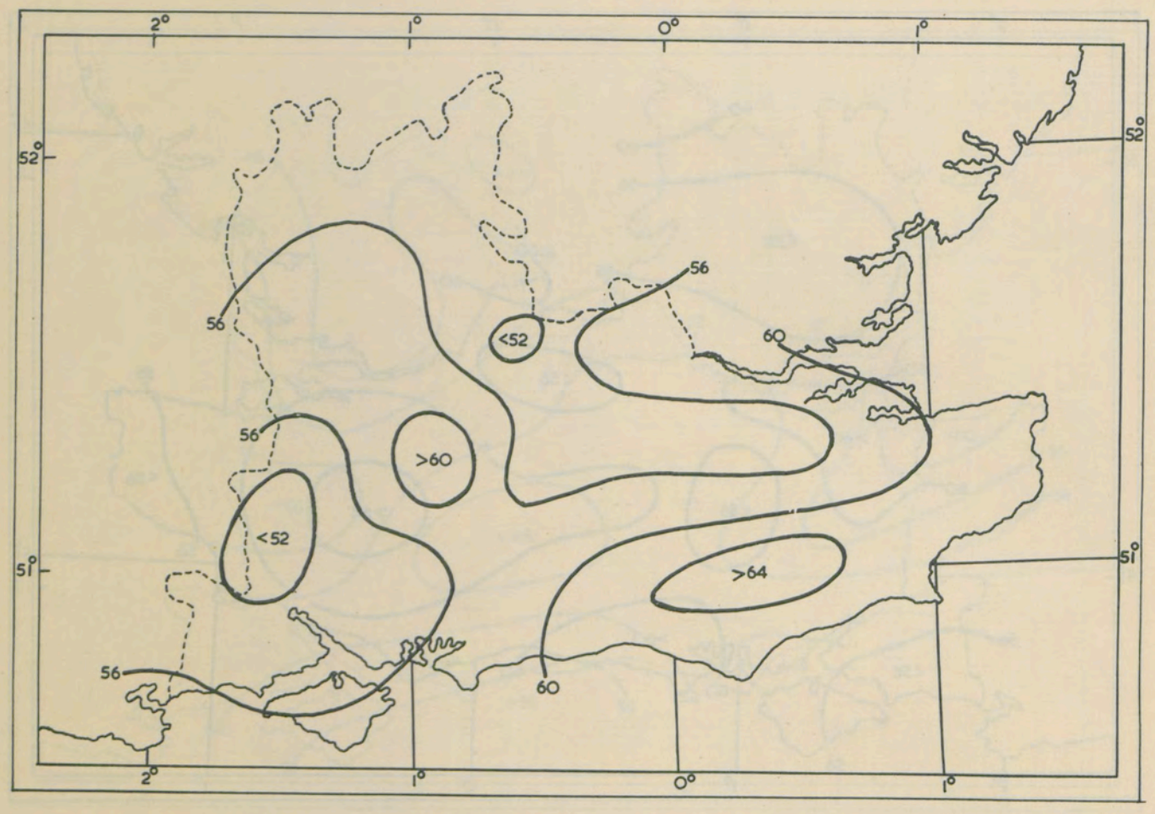

FIG. 6. JUNE — 3 or more days

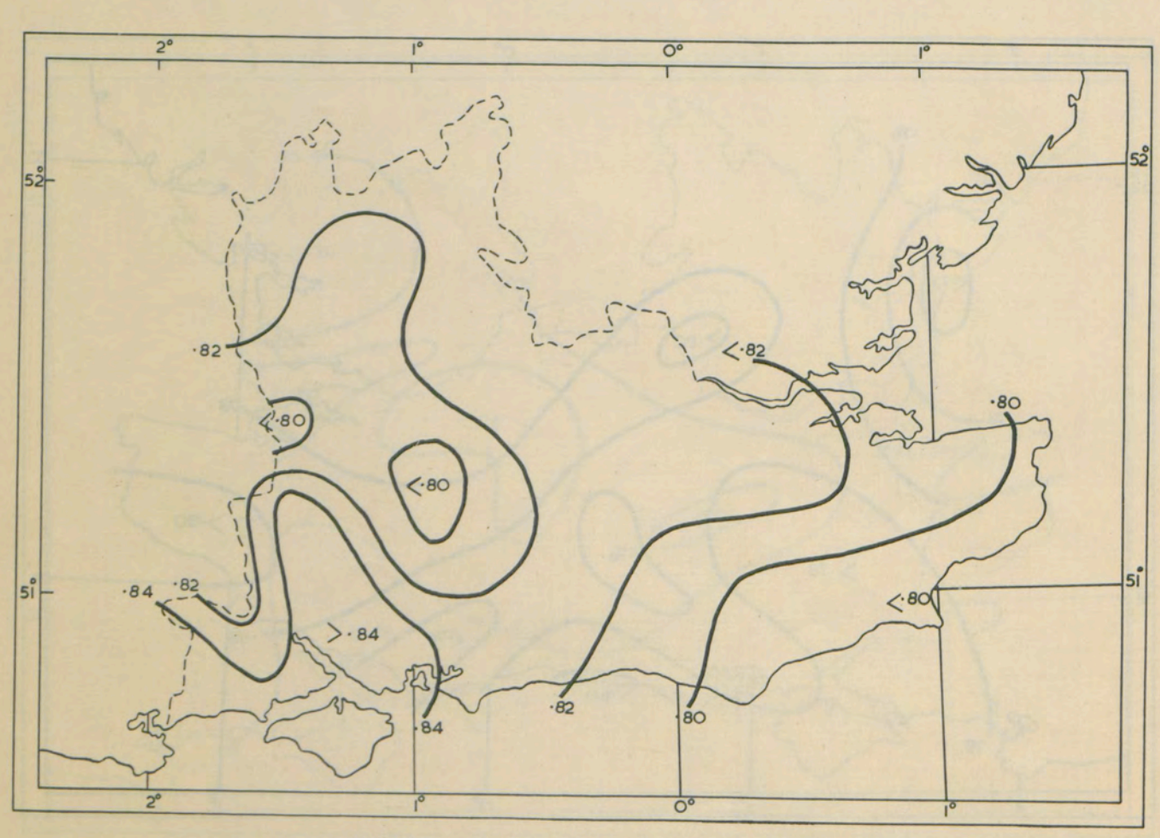

FIG.7 —JUNE, ISOPLETHS OF P

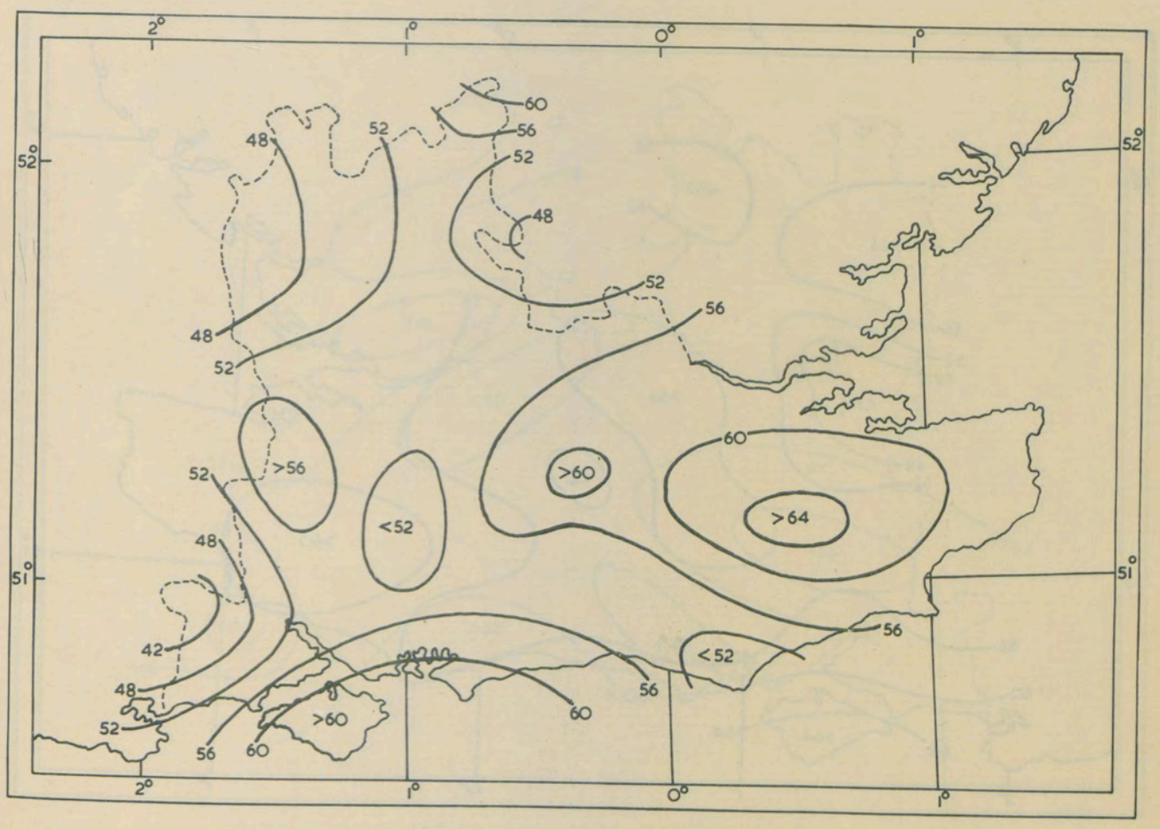

FIG. 8. JULY — 3 or more days

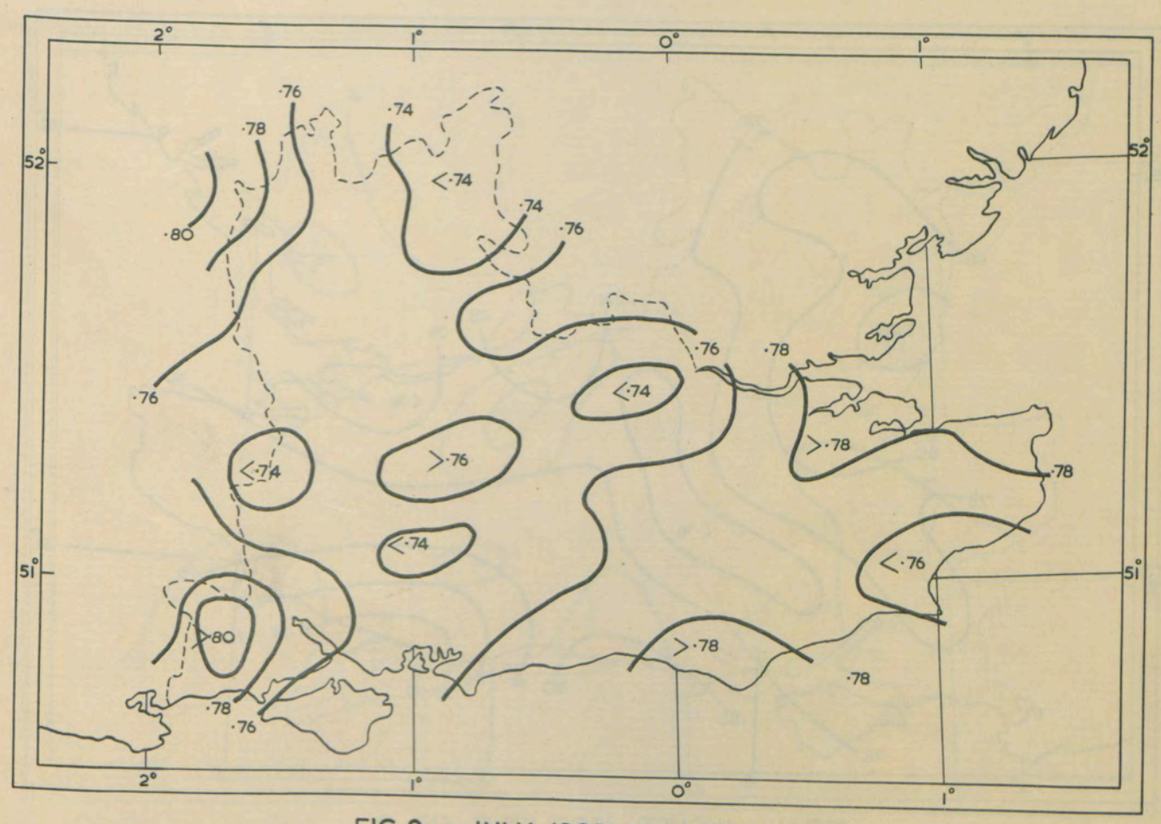

FIG. 9 —JULY, ISOPLETHS OF P

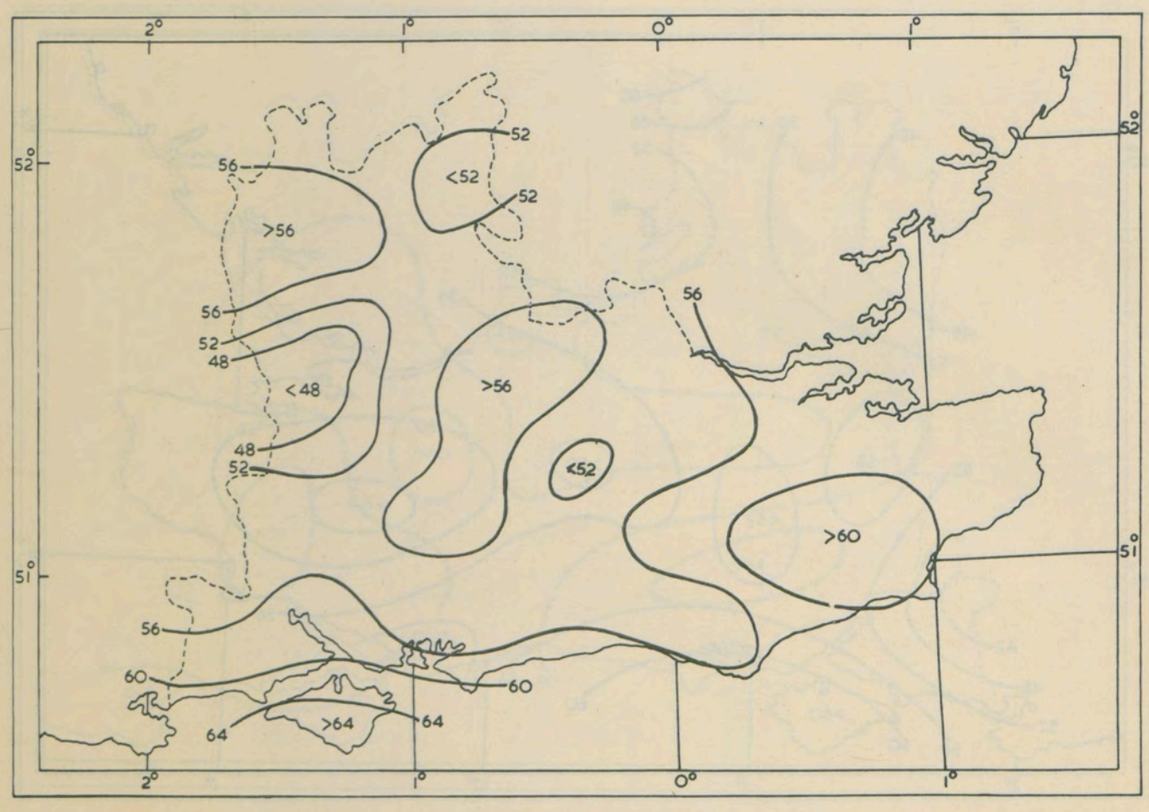

FIG.10. AUGUST — 3 or more days

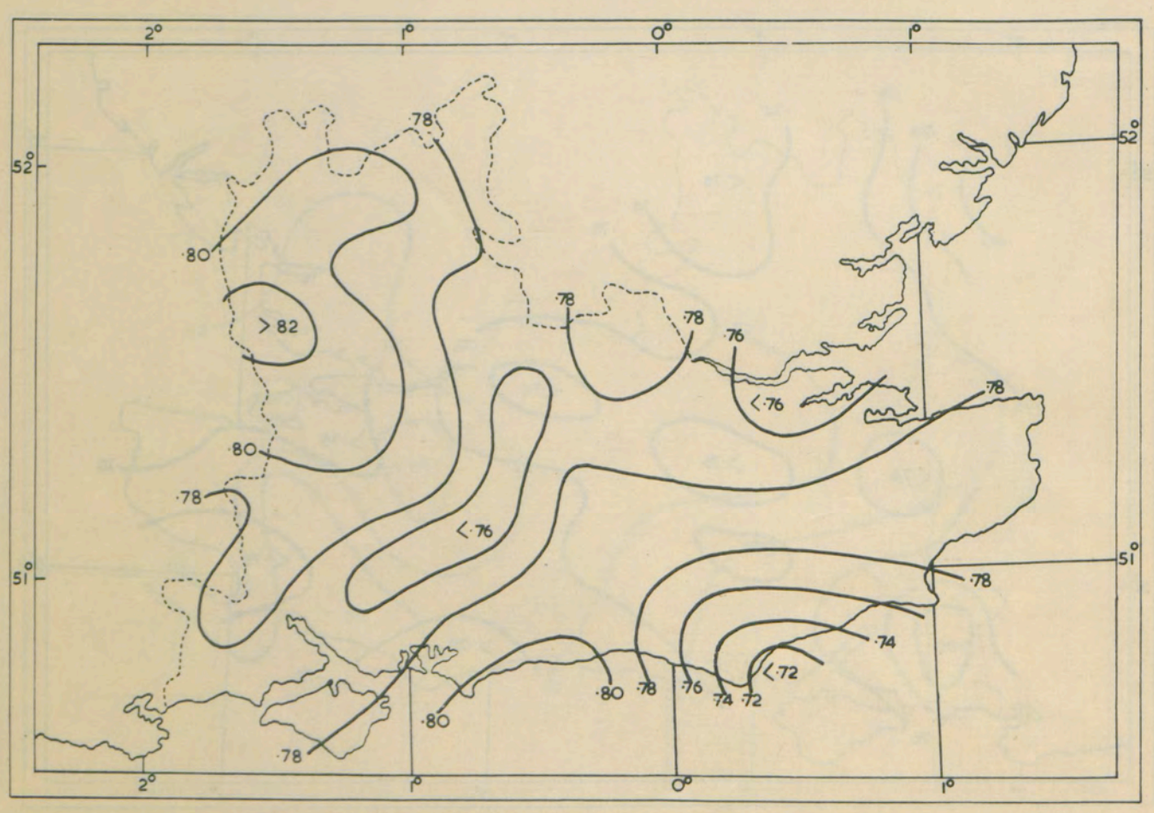

FIG.11 — AUGUST, ISOPLETHS OF P

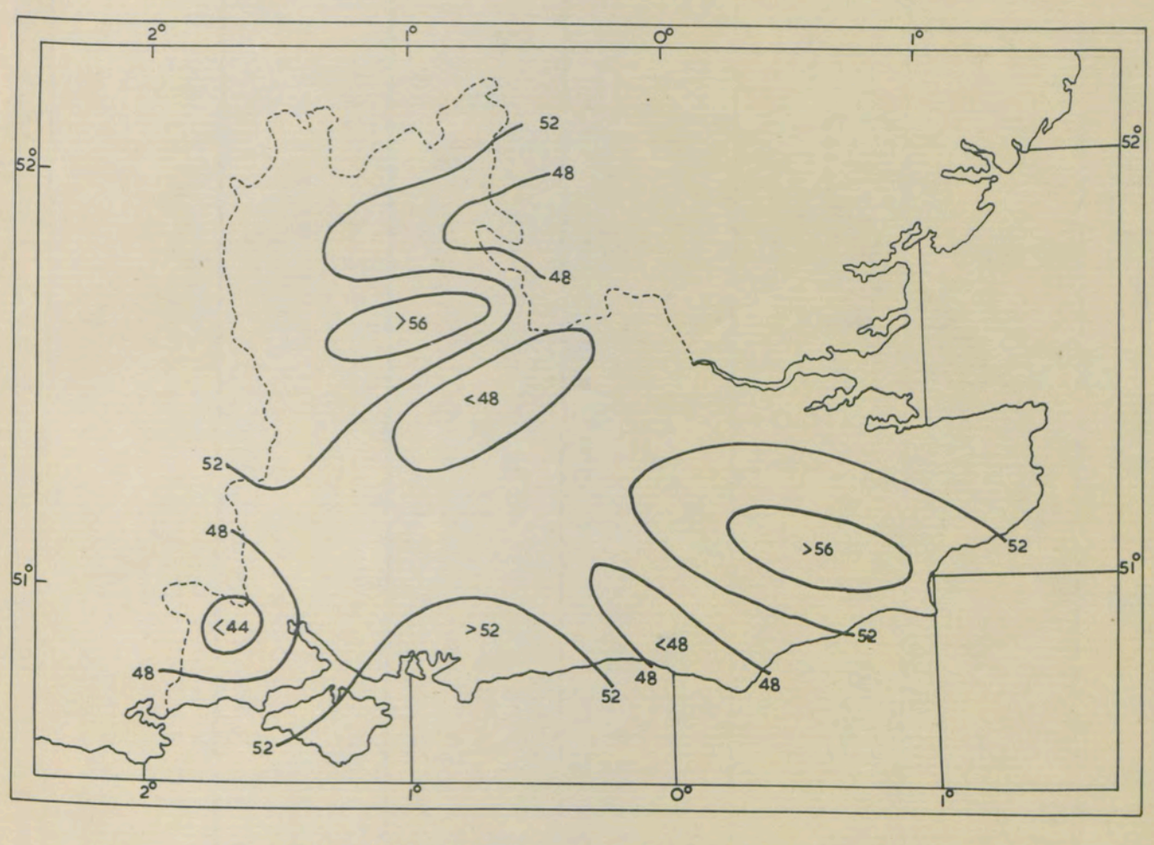

FIG.12. SEPTEMBER — 3 or more days

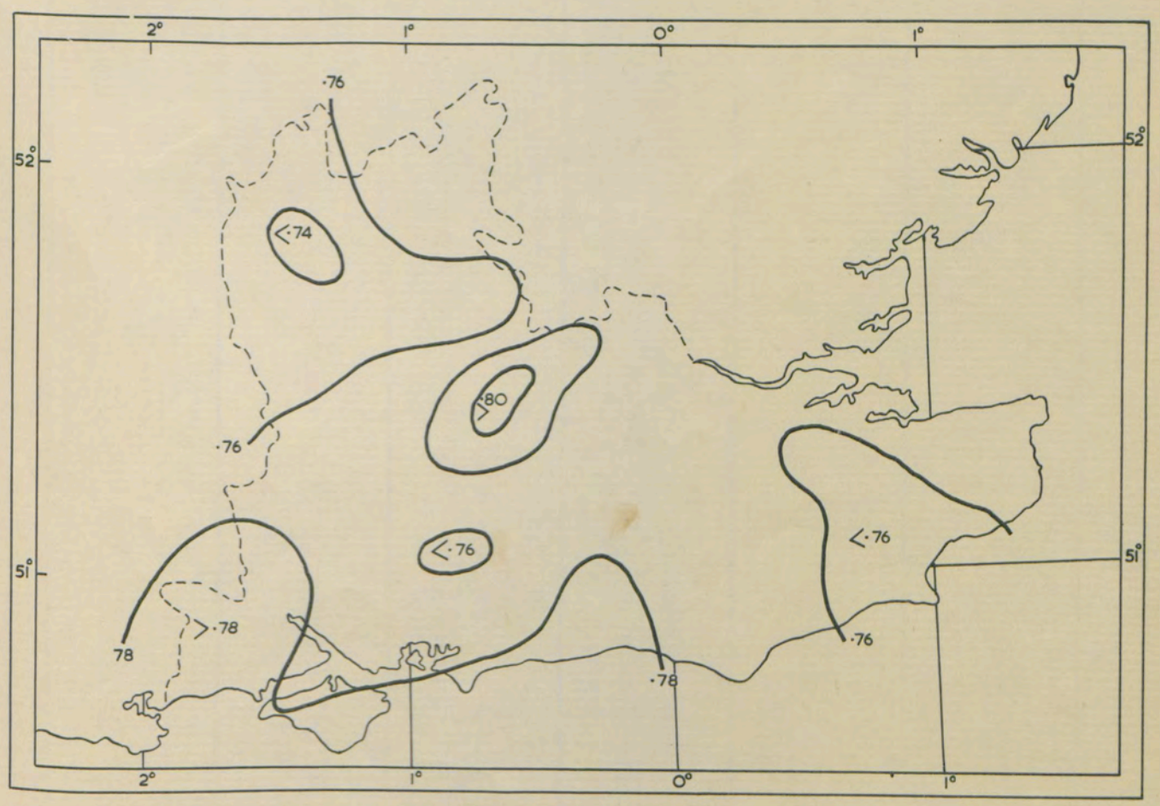

FIG.13 — SEPTEMBER, ISOPLETHS OF P